

We have one goal — improving the noise and vibration quality of our customers' products. Roush delivers innovative, effective noise and vibration control solutions. By combining advanced analysis capabilities, comprehensive engineering services, and state-of-the-art facilities, Roush has become a proven partner in identifying and resolving challenging noise and vibration issues. Backed by the diverse capabilities of the Roush family of companies, we are uniquely equipped to provide turnkey noise and vibration solutions.

Roush... your silent partner in developing smoother, quieter products.

Powertrain NVH Engineering

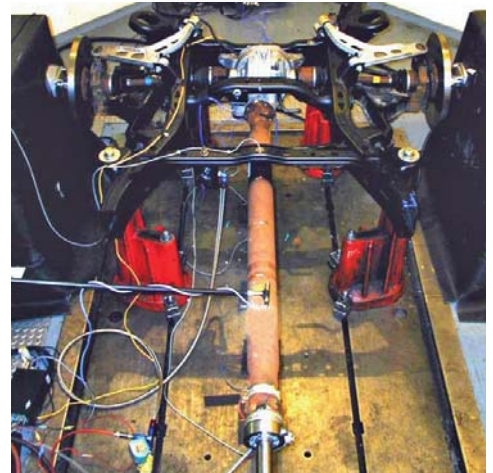
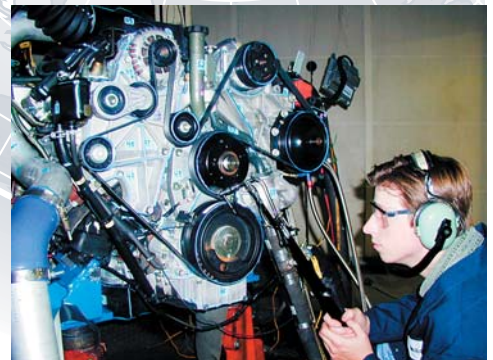
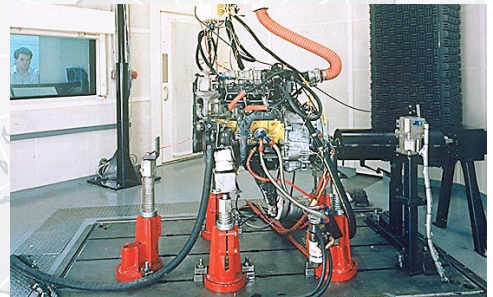
Roush Noise and Vibration Engineering has over 25 years of experience in reducing powertrain noise and vibration. The company is a proven performer when it comes to optimizing NVH in full powerplant development or when solving targeted problems.

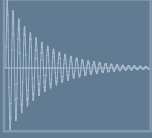
The acoustic environment of Roush's four hemi-anechoic dynamometer test cells is ideally suited for noise and vibration development and problem solving. The cells are equipped with state-of-the-art instrumentation and controls and offer unparalleled flexibility, including dual dynamometer operation. We can test gas and diesel engines, front and rear wheel drive powerplants, hybrids, electric powerplants, and transmissions. For competitive benchmarking, we can test a powertrain in the test cell with an umbilical to the vehicle outside the cell to supply all the required vehicle signals. We develop specialized test rigs to effectively solve problems as needed.

A vast repertoire of experimental methods can be used to identify and characterize noise and vibration problems. These include

- Sound pressure noise characterization
- Acoustic intensity measurement
- Modal analysis
- Operating deflection shape analysis
- Real time animation
- Frequency response testing
- Noise path analysis
- Order tracking
- Crankshaft bending and torsion testing
- Combustion NVH
- NVH benchmarking

Roush can validate analytical results using state-of-the-art correlation techniques. Combining experimental data with the latest CAE analysis tools allows our engineers to solve NVH problems in very complex mechanisms.





NOISE AND VIBRATION ENGINEERING

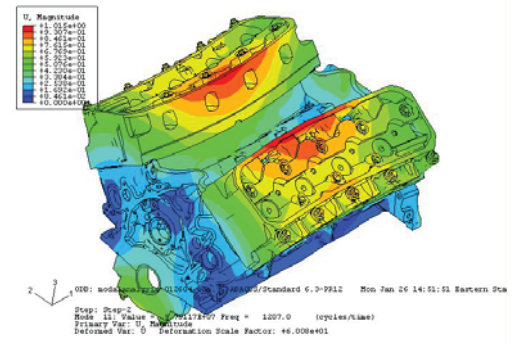
Based on the results, design modifications can be implemented using constrained layer damping, tuned dampers, isolation, structural modifications or a wide variety of acoustic treatments.

We have experience with powertrain projects involving

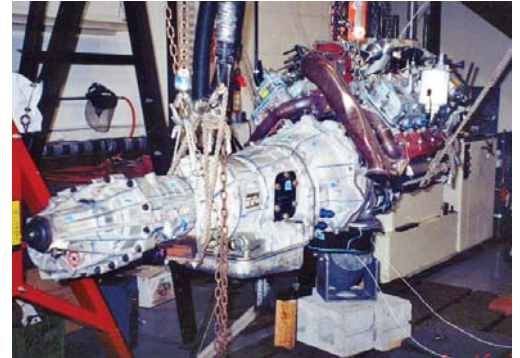
- Automotive
- Heavy trucks
- Off-highway equipment
- Lawn and garden equipment
- Recreational vehicles
- Military vehicles

In cooperation with other divisions within Roush, we offer

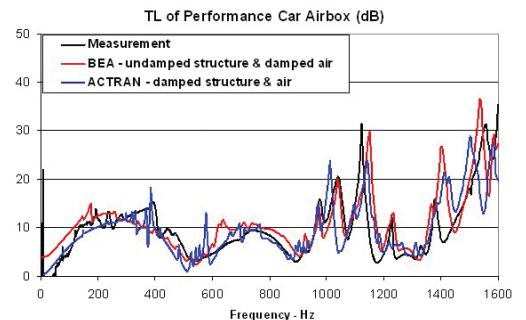
- Engine development
- Durability testing
- Engine build services
- Engine calibration services
- Fabrication of prototype components
- Composite prototype and production parts
- Rapid prototyping and stereolithography
- Environmental chamber testing
- Technical writing and publication
- Vehicle emission certification



Finite element modal model of engine block



Powertrain suspended for modal testing



Analytical prediction of transmission loss

ROUSH®

12011 Market St.
Livonia, MI 48150
Phone: 734-779-7400 or
800-486-3637
Fax: 734-779-7903
NVH@roushind.com

www.roushind.com/nvh

As a division of Roush Industries, Roush Noise and Vibration Engineering has the expertise to solve your powertrain NVH problems and help exceed your goals.